

# TEST SERIES CSIR-NET/JRF Dec. 2017

BOOKLET SERIES **A**

## INORGANIC CHEMISTRY

Paper Code **01**

Test Type: **TEST SERIES**

### CHEMICAL SCIENCES

Duration: 2:00 Hours

Date: 21-11-2017

Maximum Marks: 180

Read the following instructions carefully:

\* Single Paper Test is divided into **THREE** Parts.

**Part - A:** This part shall carry **10** questions. Each question shall be of **2** marks.

**Part - B:** This part shall carry **20** questions. Each question shall be of **2** marks.

**Part - C:** This part shall contain **30** questions. Each question shall be of **4** marks.

\* Darken the appropriate bubbles with HB pencil/Ball Pen to write your answer.

\* There will be negative marking @25% for each wrong answer.

\* The candidates shall be allowed to carry the Question Paper Booklet after completion of the exam.

\* For rough work, blank sheet is attached at the end of test booklet.

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## PART – A

- In a certain code, SIKKIM is written as THLJLL. How is TRAINING written in that code?  
(a) SQBHOHOF (b) UQBHOIOF  
(c) UQBHOHOI (d) UQBHOHOF
- The missing term in the series  
3, 4, 0, 9, \_\_\_\_\_, +18, -18, 31 is  
(a) 0 (b) -10 (c) -7 (d) 12
- If Neena says, "Anita's father Raman is the only son of my father-in-law Mahipal". Then how is Bindu, who is the sister of Anita, related to Mahipal?  
(a) Niece (b) Daughter (c) Daughter-in-law (d) None of these
- Starting from a point P, Sachin walked 20 meters towards south. He turned left and walked 30 meters. He then turned left and walked 20 meters. He again turned left and walked 40 meters and reached a point Q. How far and in which direction is the point Q from the P?  
(a) 30 metres, west (b) 10 metres, west  
(c) 30 metres, north (d) 10 metres, north
- A, P, R, X, S and Z are sitting in a row. S and Z are in the centre. A and P are at the ends. R is sitting to the left of A. Who is to the right of P?  
(a) A (b) X (c) S (d) Z
- Choose the box that is similar to the box formed from the given sheet of paper (X)



(X)



(1)



(2)



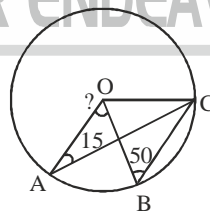
(3)



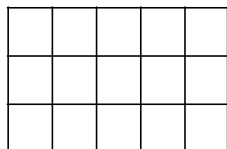
(4)

- (a) 1 and 4 only (b) 3 and 4 only (c) 1 and 2 only (d) 2 and 3 only

- By selling an article at  $\frac{2}{5}$  of the marked price, there is a loss of 25%. The ratio of the marked price and the cost price of the article is.  
(a) 2:5 (b) 5:2 (c) 8:15 (d) 15:8
- In the given figure O is the centre  $\angle OBC = 50$  and  $\angle OAC = 15$ . Then the value of the  $\angle AOB$  is



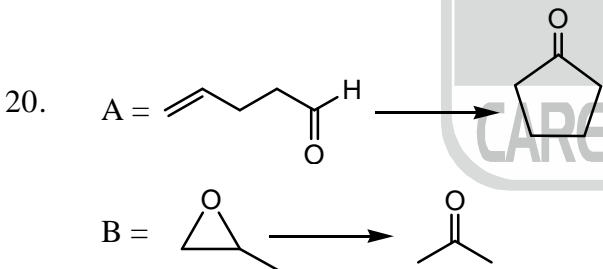
- (a) 30 (b) 40 (c) 20 (d) 70
- How many squares are there in the following figure?



- (a) 124 (b) 25 (c) 26 (d) 227
- Gold is 19 times as heavy as water and copper is 9 times as heavy as water. In what ratio should these be mixed to get an alloy 15 times as heavy as water?  
(a) 1:1 (b) 2:3 (c) 1:2 (d) 3:2

## PART – B

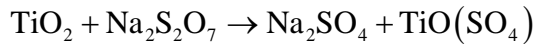
11. Number of signals in the Mössbauer spectrum of  $\text{Fe}_3(\text{CO})_{12}$  and  $\text{Fe}_2(\text{CO})_9$  is  
 (a) 1 and 2 (b) 2 and 3 (c) 4 and 1 (d) 2 and 1
12. The intensity pattern in the ESR spectrum of  $\text{CD}_3$  radical molecule is  
 (a) 1 : 4 : 6 : 4 : 1 (b) 1 : 3 : 6 : 7 : 6 : 3 : 1  
 (c) 1 : 5 : 10 : 10 : 5 : 1 (d) 1 : 2 : 3 : 3 : 2 : 1
13. A free Mössbauer nucleus of mass 100.6 amu emits radiation of wavelength 0.1 nm. The recoil velocity of Doppler shift is  
 (a)  $30.52 \text{ ms}^{-1}$ ,  $3.9 \times 10^{10} \text{ m}$  (b)  $3.9 \times 10^{10} \text{ m}$ ,  $35 \text{ ms}^{-1}$   
 (c)  $40 \times 10^{10} \text{ m}$ ,  $40 \text{ ms}^{-1}$  (d)  $39.52 \text{ ms}^{-1}$ ,  $3.952 \times 10^{10} \text{ m}$
14. The number of fine and hyperfine line in the ESR spectrum of  $[\text{Fe}(\text{CN})_5\text{NO}]^{-3}$  is [NO(I = 1)]  
 (a) 1 and 4 (b) 2 and 4 (c) 1 and 3 (d) 4 and 1
15. The transition that belongs to the **Balmer Series** in the hydrogen-atom spectrum is  
 (a)  $3s \leftarrow 4d$  (b)  $2s \leftarrow 4p$  (c)  $1s \leftarrow 4p$  (d)  $2s \leftarrow 2p$
16. In gas solid chromatography the fixed phase consists of a solid material such as  
 (a) Granular silica (b) Magnesium (c) Sodium (d) Calcium
17. The half life period of  ${}_{53}\text{Y}^{125}$  is 70 days. The percentage of the original radioactivity would be present after 280 days is  
 (a) 8.25% (b) 6.25% (c) 15% (d) 19%
18. Arrange the following in decreasing order of Rh–C bond length  
 (A)  $\text{Rh}(\text{CO})_2(\text{Cl})(\text{PPh}_3)_2$  (B)  $\text{Rh}(\text{CO})_2(\text{Cl})(\text{PEt}_3)_2$  (C)  $\text{Rh}(\text{CO})_2(\text{Cl})[\text{P}(\text{C}_6\text{F}_5)_3]_2$   
 (a)  $\text{C} > \text{A} > \text{B}$  (b)  $\text{C} > \text{B} > \text{A}$  (c)  $\text{B} > \text{A} > \text{C}$  (d)  $\text{A} > \text{B} > \text{C}$
19. The most unstable beryllium alkyl compound is  
 (a)  $\text{BeMe}_2$  (b)  $\text{Be}(\text{CH}_2^t\text{Bu})_2$  (c)  $\text{Be}(\text{Et})_2$  (d)  $\text{Be}(\text{CH}_2\text{SiMe}_3)_2$



The correct statement about reaction A and B

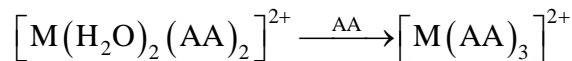
- (a) A is catalysed by Rh(I) complex,  $\text{RhCl}(\text{PPh}_3)_3$   
 (b) B is catalysed by Rh(I) complex,  $\text{RhCl}(\text{PPh}_3)_3$   
 (c) A and B both are catalysed by Rh(I) complex,  $\text{RhCl}(\text{PPh}_3)_3$   
 (d) None is catalysed by Rh(I) complex,  $\text{RhCl}(\text{PPh}_3)_3$
21. In the reactions :
- (1) graphite + K vapours  $\rightarrow$  (A)  
 (2) carbon + Ca  $\xrightarrow[\text{Temp}]{\text{High}}$  (B)  
 the products (A) and (B) respectively are  
 (a)  $\text{K}_4\text{C}$  and  $\text{Ca}_2\text{C}$  (b)  $\text{K}_2\text{C}_2$  and  $\text{CaC}$  (c)  $\text{KC}_8$  and  $\text{CaC}_2$  (d)  $\text{KC}$  and  $\text{CaC}_4$

22. The ores of Ti, Ta and Nb may be brought into solution near 800 °C using  $\text{Na}_2\text{S}_2\text{O}_7$ . A simplified reaction may be as follows :



The acid and base in the reaction are :

- (a)  $\text{Ti}^{4+}$  as base and Na in  $\text{Na}_2\text{S}_2\text{O}_7$  as acid  
 (b)  $\text{S}_2\text{O}_7^{2-}$  as base and  $\text{O}_2$  as acid  
 (c)  $\text{O}_2^{4-}$  of  $\text{TiO}_2$  (base) and  $\text{SO}_3$  in  $\text{S}_2\text{O}_7$  (acid)  
 (d)  $\text{Ti}^{4+}$  as acid and  $\text{S}^{6+}$  as acid
23. When alkali metal fluorides are dissolved in  $\text{XeOF}_4$  anion X is formed. The shape of anion X is  
 (a) distorted octahedral (b) pentagonal monopyrmidal  
 (c) octahedral (d) square antiprismatic
24. HOMO and LUMO of  $\text{I}_3^-$  respectively are  
 (a) bonding and antibonding (b) non-bonding and antibonding  
 (c) bonding and non-bonding (d) both non-bonding
25. Correct order of metal oxides in increasing order of their Neel temperature  
 (a)  $\text{MnO} < \text{FeO} < \text{CoO} < \text{NiO}$  (b)  $\text{MnO} > \text{FeO} > \text{CoO} > \text{NiO}$   
 (c)  $\text{CoO} > \text{NiO} > \text{FeO} > \text{MnO}$  (d)  $\text{NiO} > \text{FeO} > \text{CoO} > \text{MnO}$
26. Activity of catalase enzyme is inhibited by  
 (a) CO (b)  $\text{O}_2$  (c)  $\text{N}_2$  (d)  $\text{CN}^-$
27. The coordination number of complex  $[\text{UO}_2(18 \text{ crown-6})]^{2+}$   
 (a) 8 (b) 11 (c) 9 (d) 12
28. The occupation factor  $\lambda$  is 0 and 1/2 respectively for which of the following pairs of mixed oxides  
 (I)  $\text{CuAl}_2\text{O}_4$  and  $\text{Mn}_3\text{O}_4$  (II)  $\text{NiCr}_2\text{O}_4$  and  $\text{ZnFe}_2\text{O}_4$   
 (III)  $\text{Co}_3\text{O}_4$  and  $\text{CoFe}_2\text{O}_4$  (IV)  $\text{CoAl}_2\text{O}_4$  and  $\text{ZnMn}_2\text{O}_4$   
 (a) I, II and IV (b) II and IV (c) III and IV (d) III only
29. Find the value of 'x' in  $[\text{Na}_3\text{Ba}_x\text{Si}_5\text{O}_{15}]_2$   
 (a) 7 (b)  $\frac{7}{2}$  (c) 14 (d) 2
30. The equilibrium constant for following reaction of ethylenediamine with  $\text{Co}^{2+}$ ,  $\text{Ni}^{2+}$  and  $\text{Cu}^{2+}$  are  $k_1$ ,  $k_2$  and  $k_3$  respectively.



then select the correct statement from the following

- (a)  $k_2 > k_1 > k_3$  (b)  $k_3 > k_2 > k_1$  (c)  $k_2 > k_3 > k_1$  (d)  $k_2 \approx k_3 > k_1$



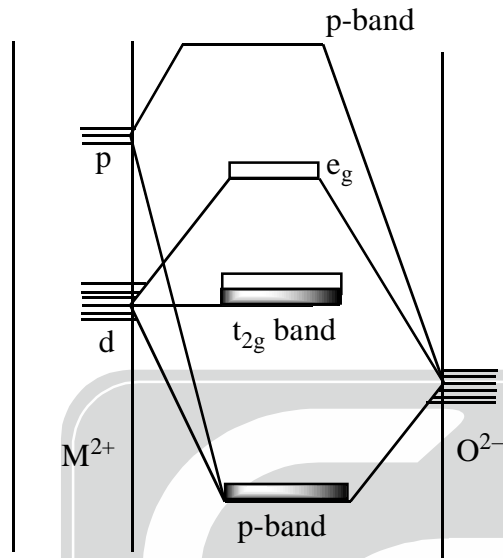
## PART – C

31. The correct statement is/are  
 (1) For an odd nucleon in 'H' nuclear orbital and parallel to I. The spin and parity for this odd electron nuclear is  $\frac{11}{2}$  and (+).  
 (2) The electric dipole allowed transition in a  $d^3$  system is  ${}^4F \rightarrow {}^4D$   
 (3) The ionisation energy for one-electron in **Lyman series** is 52 eV. The wavelength for this one electron ion is 24 nm.  
 (4)  ${}^3\Sigma \rightarrow {}^3\pi$  is allowed transition and if the ionisation energy of H atom is  $x$ . The ionisation energy of  $\text{He}^{+1}$  is  $16x$ .  
 (a) 1, 2 (b) 1, 3 (c) 1, 4, 3 (d) 2, 3, 4
32. The correct statement about gas chromatography is/are  
 (1) A gas chromatography separates components of a gaseous mixture in a column and detects the components as they are eluted.  
 (2) Useful absorbents for GSC will have very large surface areas or are very porous material  
 (3) In gas chromatographic methods are generally not applicable to highly non-polar substances  
 (a) 1, 2 (b) 1, 3 (c) 1, 2, 3 (d) 2, 3
33. The property measured in TGA is  
 (a) change in weight (b) rate of change in weight  
 (c) heat evolved or absorbed (d) change of temperature
34. The most difficult synthesis among the following synthetic transformation is  
 (a)  $\text{PtCl}_2(\text{PPh}_3)_2 + \text{Li} \text{---} \text{C}_6\text{H}_5 \text{---} \text{Li} \longrightarrow$   
 (b)  $\text{ZrCl}_4 + 4\text{PhCH}_2\text{MgCl} \longrightarrow$   
 (c)  $\text{CH}_3\text{Li} + \text{WCl}_6 \longrightarrow$   
 (d)  $\text{TiCl}_4 + 4\text{Li} \text{---} \text{C}_6\text{H}_5 \text{---} \longrightarrow$
35. Arrange the rate of substitution reaction in the following compound  

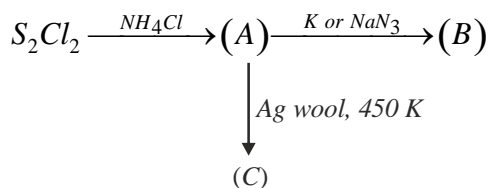
$$\text{Mo}(\text{CO})_4\text{L}_2 + \text{CO} \longrightarrow \text{Mo}(\text{CO})_5\text{L} + \text{L}$$
 L =  $\text{PhPMe}_2$  (A)  $\text{Ph}_2\text{PMe}$  (B)  $\text{PPh}_3$  (C)  
 (a)  $A > B > C$  (b)  $C > B > A$  (c)  $B > C > A$  (d)  $B > A > C$
36. Match the following
- | Column-A   | Column-B                          |
|--|-----------------------------------|
| Complex (fac isomers)                              | $\nu_{\text{CO}} \text{ cm}^{-1}$ |
| (A) $\text{Mo}(\text{CO})_3$ dien                  | (I) 2090, 2055                    |
| (B) $\text{Mo}(\text{CO})_3(\text{PPh}_3)_3$       | (II) 2040, 1991                   |
| (C) $\text{Mo}(\text{CO})_3\text{P}(\text{OMe})_3$ | (III) 1977, 1888                  |
| (D) $\text{Mo}(\text{CO})_3(\text{PF}_3)_3$        | (IV) 1934, 1835                   |
| (E) $\text{Mo}(\text{CO})_3(\text{PCl}_3)_3$       | (V) 1898, 1758                    |
| (a) A-5, B-4, C-2, D-1, E-3                        | (b) A-4, B-2, C-5, D-1, E-3       |
| (c) A-5, B-4, C-3, D-1, E-2                        | (d) A-3, B-2, C-5, D-1, E-5       |

37. Identify the correct statement
- (A) The cluster electron count and number of M–M bond in  $\text{Cp}_3\text{Co}_3(\mu^3-\text{CS})(\mu^3-\text{S})$  is 48 electron and 3 M–M bond respectively.
- (B) The complex  $\text{OC}=\text{Mo}(\text{CO})_5$  is isolobal with  $\text{OC}=\text{CH}_2$
- (C)  $[\text{Rh}_7(\text{CO})_{16}]^{3-}$ ,  $[\text{Os}_7(\text{CO})_{21}]$  are isostructural
- (D) The ionic crystal  $\text{Bi}_5^{3+}$  is closo while  $\text{Sn}_9^{4-}$  is arachano structure
- (a) A and B                      (b) C and D                      (c) A, B and C                      (d) A and C
38. 1.84 gm of  $\text{IF}_3$  reacts with 1.86 gm of  $[\text{Me}_4\text{N}]\text{F}$  to form product X. The shape of anion and number of  $^{19}\text{F}$  NMR signals in  $\text{IF}_3$  and X respectively are
- (a) square planar, 2, 1                      (b) TBP, 2, 2
- (c) Pentagonal planar, 2, 1                      (d) Td, 2, 2
39. Arrange the decreasing order of rate constants ( $k/\text{dm}^3\text{mol}^{-1}\text{s}^{-1}$ ) for following electron transfer reaction in aqueous medium and select the reaction(s) for which  $\Delta G^0 = 0$
- (I)  $[\text{Ru}(\text{NH}_3)_6]^{3+} + [\text{Ru}(\text{NH}_3)_6]^{2+}$                       (II)  $[\text{Co}(\text{NH}_3)_6]^{3+} + [\text{Ru}(\text{NH}_3)_6]^{2+}$
- (III)  $[\text{Co}(\text{NH}_3)_6]^{3+} + [\text{Co}(\text{NH}_3)_6]^{2+}$
- (a)  $\text{II} > \text{I} > \text{III}$ ,  $\Delta G^0 = 0$  for I and III                      (b)  $\text{I} > \text{II} > \text{III}$ ,  $\Delta G^0 = 0$  for I and II
- (c)  $\text{I} > \text{II} > \text{III}$ ,  $\Delta G^0 = 0$  for I and III                      (d)  $\text{III} > \text{II} > \text{I}$ ,  $\Delta G^0 = 0$  for I
40. Identify the incorrect statement(s)
- (I) Each subunit in deoxyhaemoglobin contain 5-coordinate Fe(II), but in cytochrome-c, the Fe centre is always 6-coordinate
- (II) Cytochrome-c oxidase contain more than one metal centre
- (III) The binding of  $\text{O}_2$  to myoglobin exhibit a cooperative effect
- (IV) Cytochrome P-450 is dioxygenase
- (a) I, II and III                      (b) I, II, III and IV                      (c) I, III and IV                      (d) III and IV
41. The ground state term symbol and magnetic moment (BM) for  $\text{Tm}^{3+}$  is
- (a)  $^3\text{I}_6$  and 9.58                      (b)  $^2\text{H}_5$  and 7.56                      (c)  $^3\text{H}_6$  and 7.56                      (d)  $^3\text{F}_{7/2}$  and 9.58
42. Egyptian blue,  $\text{CaCuSi}_4\text{O}_{10}$  (I) is pale blue and spinel  $\text{CuAl}_2\text{O}_4$  (II) is an intense blue-green. The difference in colours is due to
- (a) LMCT in I and d-d transition in II                      (b) d-d transition in both
- (c) difference in geometry of Cu in I and II                      (d) d-d in first and LMCT in II
43. At low aqueous concentrations and at ordinary temperature the extent of exchange of ions in exchanger column is
- (a)  $\text{Li}^+ < \text{Na}^+ < \text{NH}_4^+ < \text{K}^+ < \text{Rb}^+ < \text{Cs}^+$                       (b)  $\text{Li}^+ > \text{Na}^+ > \text{NH}_4^+ > \text{K}^+ > \text{Rb}^+ > \text{Cs}^+$
- (c)  $\text{Li}^+ < \text{Na}^+ < \text{NH}_4^+ < \text{K}^+ < \text{Cs}^+ < \text{Rb}^+$                       (d)  $\text{Li}^+ < \text{Na}^+ > \text{NH}_4^+ < \text{K}^+ < \text{Rb}^+ < \text{Cs}^+$
44. Correct statement(s) regarding Uranium is
- (1) most stable oxidation state of Uranium is +6
- (2) in uranocene its oxidation state is +4
- (3) in  $\text{UO}_2^+$  colour is due to LMCT
- (4) Electronic configuration of Uranium corresponds  $(\text{Rn})5f^3 6d^1 7s^2$
- (a) 1, 2                      (b) 1, 2, 4                      (c) 1, 2, 3, 4                      (d) 2, 3, 4

45. In a complex  $\text{trans-}[\text{CuX}_4\text{Y}_2]^{2+}$  the  $\text{Cu}-\text{X}$  bond is larger than that of  $\text{Cu}-\text{Y}$  bond, what is correct electron arrangement of complex
- (a)  $(d_{xy})^2 (d_{yz})^2 (d_{xz})^2 (d_{x^2-y^2})^2 (d_{z^2})^1$       (b)  $(d_{xy})^1 (d_{yz})^2 (d_{xz})^2 (d_{x^2-y^2})^2 (d_{z^2})^2$   
 (c)  $(d_{xy})^2 (d_{yz})^2 (d_{xz})^2 (d_{x^2-y^2})^1 (d_{z^2})^2$       (d)  $(d_{xy})^2 (d_{yz})^2 (d_{xz})^1 (d_{x^2-y^2})^2 (d_{z^2})^2$
46. Among the following metal oxides conductivity of which oxide corresponds to given molecular orbital energy level diagram.



- (a) FeO      (b) MnO      (c) TiO      (d) NiO
47. Compound  $\text{CoCl}_3 \cdot 5\text{NH}_3$  (A) treated with an excess of  $\text{AgNO}_3$  solution, two chloride ions are precipitated. A on reaction with  $\text{NaNO}_2$  gives red colour compound B. Which react with warm  $\text{HCl}$  turns into yellow colour compound C. The relation between B and C is
- (a) B is octahedral compound while C is tetrahedral compound  
 (b) C is octahedral compound while B is tetrahedral compound  
 (c) B and C are constitutional isomers  
 (d) B and C are geometrical isomers
48. Consider the following reactions



Correct statement regarding above is/are

- (1)  $\text{A} = \text{S}_4\text{N}_4$        $\text{B} = \text{S}_3\text{N}_3^-$        $\text{C} = (\text{SN})_x$   
 (2)  $\text{A} = \text{S}_3\text{N}_3\text{Cl}_3$        $\text{B} = \text{S}_4\text{N}_4$        $\text{C} = (\text{SN})_x$   
 (3) B is aromatic in nature and has  $10\pi$  electrons.  
 (4)  $(\text{SN})_x$  is one dimensional metal
- (a) 1, 4      (b) 2, 3, 4      (c) 2, 4      (d) 1, 3, 4
49. The number of isomer for  $\text{P}_4\text{N}_4\text{Cl}_5\text{F}_3$  are
- (a) 3      (b) 4      (c) 5      (d) 10

50.  $\text{XeF}_4$  on complete hydrolysis produces  
 (a)  $\text{XeO}_2$  (b)  $\text{XeO}_3, \text{O}_2$  (c)  $\text{XeO}_3, \text{Xe}$  and  $\text{O}_2$  (d)  $\text{XeO}_3, \text{XeO}$  and  $\text{O}_2$
51. Correct statement(s) regarding alkali metal in liq.  $\text{NH}_3$  solution (Dilute) is/are  
 (1) Blue colour of solution is due to ammoniated cation  
 (2) Density of solution is more than density of liq.  $\text{NH}_3$   
 (3) On evaporation of  $\text{NH}_3$  pure metal can be obtained  
 (4) High conductivity of solution is largely due to ammoniated electron  
 (a) 1, 2, 3, 4 (b) 3, 4 (c) 2, 4 (d) 1, 4
52. For the complexes  $[\text{CoL}_6]^{3+}$ ,  $[\text{CrL}_6]^{3+}$ ,  $[\text{MnL}_6]^{3+}$  and  $[\text{CrL}_6]^{2+}$  (where L is a neutral monodentate ligand),  $\Delta_0$  and P values are given in the following table.

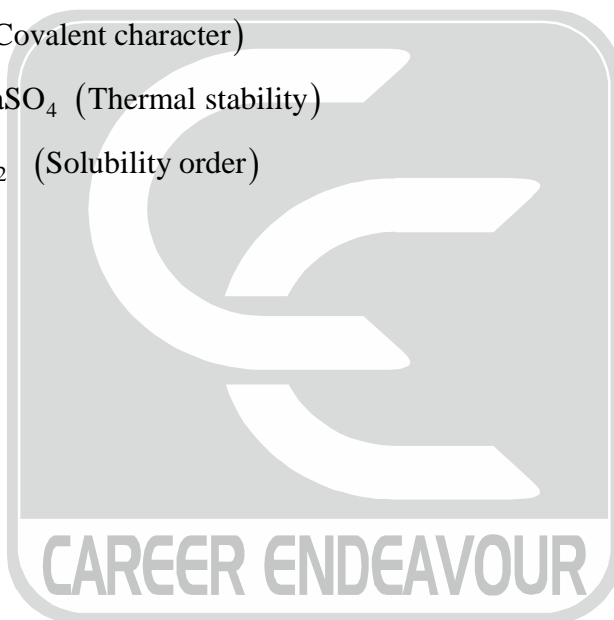
S.No.	Complex	$\Delta_0$ ( $\text{cm}^{-1}$ )	P ( $\text{cm}^{-1}$ )
(i)	$[\text{CoL}_6]^{3+}$	16500	14000
(ii)	$[\text{CrL}_6]^{3+}$	11500	13500
(iii)	$[\text{MnL}_6]^{3+}$	13500	12500
(iv)	$[\text{CrL}_6]^{2+}$	13000	12000

The correct answer is

- (a) i, ii inert and iii, iv labile (b) i, ii, iii inert and iv labile  
 (c) All are labile (d) All are inert.
53.  $\text{FeCp}_2 + \text{HF} \rightarrow \text{A}$  and  $\text{Ni}(\text{Cp})_2 + \text{HF} \rightarrow \text{B}$   
 The product A and B, respectively  
 (a)  $\text{A} = [\text{FeCp}_2\text{H}]^+$ ,  $\text{B} = [\text{NiCp}_2\text{H}]^+$   
 (b)  $\text{A} = \text{FeCp}[\eta^4\text{C}_5\text{H}_6]^+$ ,  $\text{B} = [\text{NiCp}_2\text{H}]^+$   
 (c)  $\text{A} = [\text{FeCp}(\eta^4\text{C}_5\text{H}_6)]^+$ ,  $\text{B} = [\text{NiCp}(\eta^4 - \text{C}_5\text{H}_6)]^+$   
 (d)  $\text{A} = [\text{FeCp}_2\text{H}]^+$ ,  $\text{B} = [\text{NiCp}(\eta^4 - \text{C}_5\text{H}_6)]^+$
54. The electron count, formal oxidation state, and  $d^n$  configuration of following respectively are  
 $[(\text{R}_3\text{P})_3\text{Ru}(\mu - \text{Cl})_3\text{Ru}(\text{PR}_3)_3]^+$ ,  $\text{ReH}_9^{2-}$ ,  $\text{MeReO}_3$   
 (a)  $16 e^-$  (VII),  $d^0$  (b)  $16 e^-$  (VII),  $d^5$   
 (c)  $18 e^-$  (VII),  $d^0$  (d)  $18 e^-$  (VIII),  $d^0$
55. The number of possible isomers for complexes  $[\text{Cr}(\text{O} - \text{phen})(\text{NH}_3)_2\text{Cl}_2]^+$  and  $[\text{Pt}(\text{bipy})_2\text{BrCl}]^{2+}$  respectively are  
 (a) 3 and 2 (b) 4 and 2 (c) 4 and 3 (d) 3 and 3
56. Select the correct statement(s) from following  
 (1) Blue copper proteins are not always blue  
 (2) The toxicity of CO is associated with binding to haemoglobin but that of  $\text{CN}^-$  is not  
 (3) Coenzyme  $\text{B}_{12}$  reduces  $-\text{CH}(\text{OH})$  group to  $-\text{CH}_2$  group  
 (4) Cadmium toxicity leads to a disease called Hai Itai  
 (a) 1, 4 (b) 1, 2, 3, 4 (c) 3 and 4 (d) 2, 3 and 4



57. Blue copper proteins consist of mon-nuclear copper center bound to 2 imidazole groups (histidine), one thiol group (cysteine) and one thioether group (methionine). The coordination geometry around the metal ion is distorted tetrahedral. What will be the relative value of the redox potential of the metal centre ( $\text{Cu}^{2+} / \text{Cu}^{+}$ ) in the protein compared to that of  $\text{CuSO}_4$  in water?
- (a) More positive  
(b) More negative  
(c) Equal  
(d) Redox potential of the metal centre in the protein will be zero.
58. Identify the acids in the following two reactions:
- $$\text{NOF} + \text{ClF}_3 = \text{NO} + \text{ClF}_4^-$$
- $$\text{XeO}_3 + \text{OH}^- = \text{HXeO}_4^-$$
- (a)  $\text{ClF}_3$  and  $\text{XeO}_3$   
(b)  $\text{ClF}_3$  and  $\text{OH}^-$   
(c)  $\text{NOF}$  and  $\text{OH}^-$   
(d)  $\text{NOF}$  and  $\text{XeO}_3$
59. The term symbol not possible for  $\text{B}_2$  is
- (a)  $^3\Sigma_g^-$   
(b)  $^1\Sigma_g^+$   
(c)  $^1\Delta_g$   
(d)  $^1\Sigma_u^+$
60. Choose the incorrect order of given properties
- (a)  $\text{BeCl}_2 < \text{LiCl}$  (Electrical conductivity)  
(b)  $\text{NaF} < \text{MgF}_2 < \text{AlF}_3$  (Covalent character)  
(c)  $\text{BeSO}_4 < \text{MgSO}_4 < \text{CaSO}_4$  (Thermal stability)  
(d)  $\text{HgCl}_2 < \text{HgBr}_2 < \text{HgI}_2$  (Solubility order)



*Space for rough work*





## CHEMICAL SCIENCES

Date : 21-11-2017

## TEST SERIES-A

## ANSWER KEY

## PART-A

- |        |        |         |        |        |        |        |
|--------|--------|---------|--------|--------|--------|--------|
| 1. (d) | 2. (c) | 3. (d)  | 4. (b) | 5. (b) | 6. (a) | 7. (d) |
| 8. (d) | 9. (c) | 10. (d) |        |        |        |        |

## PART-B

- |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|
| 11. (d) | 12. (b) | 13. (d) | 14. (c) | 15. (b) | 16. (a) | 17. (b) |
| 18. (c) | 19. (c) | 20. (c) | 21. (c) | 22. (c) | 23. (b) | 24. (b) |
| 25. (a) | 26. (d) | 27. (a) | 28. (d) | 29. (a) | 30. (a) |         |

## PART-C

- |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|
| 31. (d) | 32. (a) | 33. (a) | 34. (d) | 35. (b) | 36. (c) | 37. (c) |
| 38. (c) | 39. (c) | 40. (d) | 41. (c) | 42. (c) | 43. (a) | 44. (c) |
| 45. (a) | 46. (c) | 47. (c) | 48. (d) | 49. (c) | 50. (c) | 51. (b) |
| 52. (d) | 53. (d) | 54. (c) | 55. (c) | 56. (b) | 57. (a) | 58. (a) |
| 59. (d) | 60. (d) |         |         |         |         |         |

